

CLAIMS

What is claimed is:

1. An extract from a plant of *Trichosanthes* having an activity for increasing hemoglobin expression level, reactivating fetal or adult hemoglobin, inducing γ -globin, stimulating cell differentiation, inhibiting malignant cell proliferation, or treating a hemoglobinopathy or a malignant disease in a subject, prepared by a process comprising the steps of:

a) contacting the plant with a first solvent having a polarity index of more than about 2.0 to form a mixture;

b) heating the mixture to form a liquor; and

c) concentrating the liquor to form a first syrup having the activity in the subject.

2. The extract of claim 1, wherein the process further comprises:

d) extracting the first syrup with a second solvent that has a polarity index of less than that of the first solvent to form a second syrup having the activity in the subject.

3. The extract of claim 2, wherein the process further comprises:

f) purifying the second syrup thereby obtaining a compound having the activity in the subject.

4. The extract of claim 1, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

5. The extract of claim 2, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

6. The extract of claim 3, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

7. The extract of claim 4, wherein the first solvent is an aqueous solution of from about

50 to about 70% ethanol.

8. The extract of claim 5, wherein the first solvent is an aqueous solution of from about 50 to about 70% ethanol.

9. The extract of claim 6, wherein the first solvent is an aqueous solution of from about 50 to about 70% ethanol.

10. The extract of claim 2, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

11. The extract of claim 3, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

12. The extract of claim 4, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

13. The extract of claim 5, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

14. The extract of claim 6, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

15. The extract of claim 7, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

16. The extract of claim 8, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

17. The extract of claim 9, wherein the second solvent is selected from the group

consisting of water, a lower alkanol and mixtures thereof.

18. The extract of claim 15, wherein the second solvent is ethanol.

19. The extract of claim 16, wherein the second solvent is ethanol.

20. The extract of claim 17, wherein the second solvent is ethanol.

21. The extract of claim 1, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

22. The extract of claim 6, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

23. The extract of claim 9, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

24. The extract of claim 17, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

25 The extract of claim 20, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

26. A method for preparing an extract of a plant of *Trichosanthes* having an activity for increasing hemoglobin expression level, reactivating fetal or adult hemoglobin, inducing γ -globin, stimulating cell differentiation, inhibiting malignant cell proliferation, or treating a hemoglobinopathy or a malignant disease in an subject, comprising the steps of:

a) contacting the plant with a first solvent having a polarity index of more than about 2.0 to form a mixture;

b) heating the mixture to form a liquor; and

c) concentrating the liquor to form a first syrup having the activity in the subject.

27. The method of claim 26, further comprising:

d) extracting the first syrup with a second solvent that has a polarity index of less than that of the first solvent to form a second syrup having the activity in the subject.

28. The method of claim 27, further comprising:

f) purifying the second syrup thereby obtaining a compound having the activity in the subject.

29. The method of claim 28, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

30. The method of claim 29, wherein the first solvent is an aqueous solution of from about 50% to about 70% ethanol.

31. The method of claim 30, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

32. The method of claim 31, wherein the second solvent is ethanol.

33. The method of claim 32, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

34. A pharmaceutical composition for increasing hemoglobin expression level, reactivating fetal or adult hemoglobin, inducing γ -globin, stimulating cell differentiation, inhibiting malignant cell proliferation, or treating a hemoglobinopathy or a malignant disease in a subject, comprising an effective amount of an extract from a plant of *Trichosanthes* and a pharmaceutically acceptable carrier, wherein the extract is prepared by a process comprising the steps of:

a) contacting the plant with a first solvent having a polarity index of more than about 2.0 to form a mixture;

b) heating the mixture to form a liquor; and

c) concentrating the liquor to form a first syrup having the activity in the subject.

35. The pharmaceutical composition of claim 34, wherein the process further comprises:

d) extracting the first syrup with a second solvent that has a polarity index of less than that of the first solvent to form a second syrup having the activity in the subject.

36. The pharmaceutical composition of claim 35, wherein the process further comprises:

f) purifying the second syrup thereby obtaining a compound having the activity in the subject.

37. The pharmaceutical composition of claim 36, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

38. The pharmaceutical composition of claim 37, wherein the first solvent is an aqueous solution of from about 50% to about 70% ethanol.

39. The pharmaceutical composition of claim 38, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

40. The pharmaceutical composition of claim 39, wherein the second solvent is ethanol.

41. The pharmaceutical composition of claim 40, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

42. Use of a plant of *Trichosanthes* in preparing pharmaceuticals for increasing hemoglobin expression level, reactivating fetal or adult hemoglobin, inducing γ -globin, stimulating cell differentiation, inhibiting malignant cell proliferation, or treating a hemoglobinopathy or a

malignant disease in an subject, comprising mixing an effective amount of an extract from the plant of *Trichosanthes* with a pharmaceutically acceptable carrier, wherein the extract is prepared by a process comprising the steps of:

a) contacting the plant with a first solvent having a polarity index of more than about 2.0 to form a mixture;

b) heating the mixture to form a liquor; and

c) concentrating the liquor to form a first syrup having the activity in the subject.

43. The use of claim 42, wherein the process further comprises:

d) extracting the first syrup with a second solvent that has a polarity index of less than that of the first solvent to form a second syrup having the activity in the subject.

44. The use of claim 43, wherein the process further comprises:

f) purifying the second syrup thereby obtaining a compound having the activity in the subject.

45. The use of claim 44, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

46. The use of claim 45, wherein the first solvent is an aqueous solution of from about 50% to about 70% ethanol.

47. The use of claim 46, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

48. The use of claim 47, wherein the second solvent is ethanol.

49. The use of claim 48, wherein the step b) is performed at a temperature ranging from about 40° to about 80°C.

50. A method for increasing hemoglobin expression level, reactivating fetal or adult hemoglobin, inducing γ -globin, stimulating cell differentiation, inhibiting malignant cell proliferation, or treating a hemoglobinopathy or a malignant disease in an subject, comprising administering an effective amount of an extract from a plant of *Trichosanthes* to the subject, wherein the extract is prepared by a process comprises the steps of:

- a) contacting the plant with a first solvent having a polarity index of more than 2.0 to form a mixture;
- b) heating the mixture to form a liquor; and
- c) concentrating the liquor to form a first syrup having the activity in the subject.

51. The method of claim 50, wherein the process further comprises:

- d) extracting the first syrup with a second solvent that has a polarity index of less than that of the first solvent to form a second syrup having the activity in the subject.

52. The method of claim 51, wherein the process further comprises:

- f) purifying the second syrup thereby obtaining a compound having the activity in the subject.

53. The method of claim 52, wherein the first solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

54. The method of claim 53, wherein the first solvent is an aqueous solution of from about 50% to about 70% ethanol.

55. The method of claim 54, wherein the second solvent is selected from the group consisting of water, a lower alkanol and mixtures thereof.

56. The method of claim 55, wherein the second solvent is ethanol.

57. The method of claim 56, wherein the step b) is performed at a temperature ranging

from about 40° to about 80°C.

58. The method of claim 50, wherein the hemoglobinopathy includes sickle cell syndromes, thalassemia syndromes, or other genetic mutations of the globin gene locus.

59. The method of claim 50, wherein the malignant disease includes neoplastic, tumorigenic or malignant cell growth, or malignant hematological disorders.